Why are NEAs important?

- Earth exists in a swarm of them
- low-probability but high-consequence collision hazards
- the cheapest targets of human or robotic exploration
  beyond the Earth- Moon system
- sources of chemically bound water and other potentially valuable minerals
- keys to understanding relationships between meteorites, main-belt
  asteroids, and comets
- extremely strange and diverse and amazing places

Why are binary NEAs interesting?

- We LIVE on the primary component of a binary system.
- nature, origin, and evolution are mysterious and very different
  from solitary NEAs
- abundant: maybe 1/6 of population larger than a few hundred meters
- extreme challenge to understand all the physics
- awesome challenge to explore with spacecraft (no space agency has suggested a mission)
- awesome challenge to deflect
- amazing places to visit

Significance of the *Science* papers

- best images yet of a binary small body
- best physical characterization of a km+ PHA
- most unusual NEA yet observed + novel physical phenomena
  * Alpha shape
  * Alpha high porosity ==> rubble pile
  * Alpha equatorial ridge almost in orbit
  * Alpha spinning near disruption limit
  * Beta libration, oscillations in orbit size and shape
  * coupling of orbital and rotational dynamics is critical
  * excited: Role of Sun and probably Earth flybys in excitation
  * young
- whole new realm of (extremely complex) dynamics
- major implications for dealing with the collision hazard
- milestone in understanding exotic processes and properties of NEAs
- KW4, as provocatively unusual as it appears, may in fact be the
  archetypical model of many binary NEAs.
- major lines of inquiry opened up
  three-body problem
  modeling origin
  understanding dissipation/rigidity in low-gravity particulate assemblages

- an extraordinary sky from either component: Beta subtends ~9° from Alpha pole and ~13° from Alpha equator. Alpha subtends ~33° from Beta.

Comparable geometries:	Beta	3.3 Alpha radii
	Phobos	2.76 Mars radii
	Amalthea	2.54 Jupiter radii

close approaches predictable during 1179-2946
13 lunar distances in 2001 was closest until 2036